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ABSTRACT

This paper argues that successful programs for students with learning disabilities provide ongoing, intensive, explicit, and direct instruction in learning strategies that enable students to become independent learners. It then describes SMARTER teaching, a method developed to help teachers shift their approaches to teaching to make them more sensitive to the information processing needs. SMARTER is an acronym for a series of instructional steps that, when implemented, provide a framework for selecting accommodations that can address information processing differences. The steps include: (1) Shape critical questions that students should be able to answer to capture the essence of the lesson; (2) Map the critical content by drawing a content map of the information that the student will need to know to answer the questions; (3) Analyze difficulties students could encounter in processing the information; (4) Reach enhancement decisions using the critical questions and the content map; (5) Teach strategically by informing students about accommodation tactics or devices that have been selected and involving them in creating and using the device; (6) Evaluate mastery of the information; and (7) Revisit outcomes to ensure that students are able to answer the critical questions. A chart is provided that lists accommodations for instructional goals. (CR)

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SMARTER teaching: Developing accommodations to reduce cognitive barriers to learning for individuals with learning disabilities

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The modern era of special education in the United States is rooted in the notion that educational opportunity should be equal for students with and without educational disabilities. Providing appropriate accommodations is essential to ensuring that equal opportunity for many students with special needs. Unfortunately, some educators view accommodations as "special rights" or "cheating." A classic example is the use of recorded books. Those who are critical rightly argue that students who need to develop basic phonological processing skills will not benefit from a dependence on recorded texts. Those individuals are right if the recordings are being used in place of specific instruction in the reading process. Yet, the use of recorded books is appropriate if the purpose is to expose the student to content classmates are learning through reading. Not only will this simple accommodation provide the struggling reader with equal access to curricular content but it will help her or him to develop a knowledge that will contribute to developing proficiency in the basic skills of reading.

Accommodations are sometimes considered to be modifications and in other instances thought of as the removal of barriers. Both conceptualizations are correct. For example, a student with motor control difficulties may be accommodated when required to provide a written report by modifying the task to allow for writing on

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wide lined paper. If the reason for the report is to demonstrate knowledge of a topic (as opposed to skill at the mechanics of writing) the same student might be accommodated by reporting the content orally, thus removing the barrier of the writing task.

An educational accommodation provides equal access to learning opportunities by not just providing the learner with access to content or a task at which she or he will likely fail. An appropriate accommodation minimizes the likelihood of failure. Appropriate educational accommodations are determined by taking into account the unique learning needs of the learner for whom they are planned.

Many accommodations provided to individuals with learning disabilities in academic, vocational, and employment settings involve altering place, time, or performance conditions. Such accommodations allow the individual to process information in his or her own way while the learning situation is adjusted. These types of accommodations are not sufficient, however, if the individual still processes information in a manner that does help him or her meet core academic, vocational, or employment demands. For example, providing for oral administration of tests may not benefit an individual if the oral administration of the test negatively affects the use of good test-taking strategies or if the test taker does not know good test-taking strategies. Likewise, notetakers may not lead to improved test performance if as a consequence of someone else taking the notes the learner does not comprehend the information, has difficulty organizing it, or struggles with studying and self-testing.

Successful programs for individuals with learning disabilities provide ongoing, intensive, explicit, and direct instruction in learning strategies that enable students to become independent learners (Lenz, Ellis, & Scanlon, 1996). Once students learn strategies they are better able to profit from accommodations that allow for independent learning and performance. However, students who must face the demands encountered in academic, vocational, and employment settings on a daily basis often have not been taught appropriate learning strategies. Then, accommodations that only provide performance alternatives may not adequately address the cognitive barriers that prevent success. Accommodations that reduce

cognitive barriers associated with learning disabilities by enhancing the learner's strategic learning are at least as important as the other types of accommodations and interventions that are frequently provided.

SMARTER Teaching

Perhaps the greatest barrier to improved teaching and learner achievement for students is the reluctance to abandon a "content coverage" approach to teaching (Scanlon, Schumaker, & Deshler, 1994). A significant amount of research has been conducted by researchers at the University of Kansas Center for Research on Learning investigation methods that teachers can use to enhance and transform content in ways that will accommodate different modes of processing information (Bulgren & Lenz, 1996; Lenz, Bulgren, & Hudson, 1990). A clear set of recommendations and procedures have been developed to help teachers shift their approaches to teaching to make them more sensitive to the information processing needs of their students. Specifically, this line of research indicates that more time needs to be spent on selecting the critical content, deciding what is the best way to think about and organize that information, identifying potential problems in information processing, planning instructional activities that facilitate good information processing, providing explicit explanations and leadership during instruction, checking frequently to ensure that students have made appropriate connections and have learned the information, and making sure that students have fully mastered critical information before moving on to the teaching of additional content. Teachers can shift to instruction that is more accommodating to the range of information processing differences learners with learning disabilities present through SMARTER teaching. SMARTER is an acronym for a series of instructional steps that when implemented provide a framework for selecting accommodations that can address information processing differences for students with learning disabilities.

Shape the critical questions. Develop three or four questions concerning content you judge as critical to a lesson, that a student should be able to answer to capture the essence of the lesson. The creation of the questions will then shift instructional planning from activities and objectives toward the types of thinking that must be

done to complete activities and objectives. A question can be tied to conceptual knowledge (e.g., How did the Vietnam war begin?) or performance knowledge (e.g., How do you write a paragraph?). The question will make planning more learner-centered in regard to information-processing.

Map the critical content. Draw a content map of the information that the student will need to know to answer the questions. The map should be simple and focus on the critical concepts and supporting details that represent your best ideas about how to help the learner think about and remember the information. Plan the structure to provide a way for the student to talk about the information if you asked "What was that lesson about?"

Analyze difficulties. Examine the questions and the content map and identify what could possibly make this information difficult to process. Figure 1, shown at the end of this article, lists some possible areas of difficulties that may need to be considered. The better that the teacher knows the subject matter, the more difficult it may be to put yourself in the place of the learner who is struggling to process the information. However, the more you are familiar with the subject matter, the more likely you will be to think about alternate ways that the information can be created.

Reach enhancement decisions. Using the critical questions and the content map as a guide, decide how you will make accommodations to enhance the content so that it is more easily learned and will address information-processing differences. Select an instructional tactic or device, and decide how you will use it to enhance learning. For example, if there are a lot of details, then memory may likely be a barrier. You can lead the students through an activity where the class creates a mnemonic device to help them remember the details; you can help the students connect the details and mnemonic to a critical concept.

Figure 1 shows the types of accommodations that might need to be provided for different types of learning difficulties that might be posed by content. Figure 1 also lists the instructional goals that might be considered to help students improve their ability to perform necessary skills, reduce the need for accommodations, and move to a more independent level of learning. For example, the teacher may chose to help students develop a mnemonic to remember large amounts of information to

meet immediate academic demands. However, the teacher should also consider how students might be taught to identify, organize information that need to be remembered and then how to create their own mnemonics that could aid their studying.

Teach strategically. Inform students about the accommodation tactics or devices that have been selected. Explain to students how you are teaching them and then involve them in creating and using the device. Be explicit as you use the device. For example, in the case of the mnemonic device, explain to students that a mnemonic device needs to be created to remember a set of information. Involve students in the creation of the device. Lead the students through the development process and make them aware of how they are attacking the demand. After the device has been constructed, make sure that students list the steps that they went through as they constructed the device. The next time you need to create a memory device in class, remind students of the procedure, and lead them through the process again. The more times that you repeat the process, the more likely students will begin to see how to attack memory tasks and will begin to understand the reason for learning how to create mnemonic devices independently. By using a few simple prompting questions you can help students to make such observations, e.g., "how does a mnemonic device help you to recall?"

Evaluate mastery. Continuously check processing to make that the devices that you have selected have accommodated the information processing needs of your students. For example, if remembering was the anticipated difficulty, is there an increase in students' ability to remember information?

Revisit outcomes. After the lesson is over, are students able to answer the critical questions? If not, then the accommodations selected for the lesson may not have been aligned with the intended lesson outcomes. Either reteaching is needed, or the critical questions may need to be rewritten because they were inappropriate. For example, maybe the critical question should have been "Why was there a Vietnam War?" rather than "How did the Vietnam War begin?," because that was what you actually taught.

The Challenge of Making Cognitive Accommodations

Teachers are more likely to be successful with academically diverse groups of learners when they distinguish the critical information from the supporting information and present the critical information orally, visually, and in ways that actively involve the learner, including frequent opportunities to manipulate the information under teacher leadership. However, this is not enough. The teacher must also be prepared to facilitate information processing by helping the student learn how to think about the information. What kinds of questions should the student be asking? How should the student answer these questions? How should the answers be structured? What kinds of connections and associations to background experiences should the student be making? How will the student be able to remember this information? These types of questions serve as the basis for developing instructional accommodations that immediately compensate for ineffective or inefficient learning.

Altering instruction that responds to the information processing needs of students with learning disabilities requires that teachers understand and recognize the critical cognitive connections embedded in the content of the curriculum. This will require many teachers to shift their attention away from texts, materials, and activities and toward giving more time to reflecting on critical ideas and connections. Accommodations that only focus on providing alternate ways to complete activities or complete tasks will only help students who are also able to make the cognitive connections that make the content important and meaningful. Helping teachers take this step represents the next great challenge to providing appropriate and effective education to students with learning disabilities.

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Learning Difficulty Posed by Content	Short-Term Accommodation	Long-Term Instructional Goal
1. Abstractness	The content appears very conceptual, hypothetical and impractical. **Therefore,** students need to be provided with more concrete examples, analogies, interpretations, or experiences.	Students should be taught how to seek more examples, explanations, and interpretations through questioning and research.
2. Organization	The organization is not clear or is poorly structured. **Therefore,** students need to have the organization made more explicit for them.	Students should be taught how to survey materials and identify text organization, read to confirm organization of ideas, and reorganize information for personal understanding and use.
3. Relevance	The information does not appear to have any relationship to students or their lives. **Therefore,** students need to have the connections between information and life connections made more explicit.	Students should be taught to ask appropriate questions of relevance, search for personal connections, and explore ways to make content relevant.

Figure 1. Accomodation options based on content demands.

4. Interest	The information or presentation of the information is boring. **Therefore,** students need to have information and assignments presented in ways that build on student's attention span, participation, strengths and interests.	Students should be taught self-management strategies for controlling attention in boring situations and how to take advantage of options and choices provided in assignments to make work more interesting.
5. Skills	The information is presented at a level that assumes and requires skills beyond those possessed by students. **Therefore,** students need the information presented in ways that do not require the use of the skills they do not have.	Intensive instruction in basic skills required for basic literacy should be provided.
6. Strategies	The information is presented in ways that assumes that students know how to use the skills they have to approach tasks effectively and efficiently. **Therefore,** students need to be cued and guided in how to approach and complete learning and performance tasks.	Intensive instruction in learning strategies should be provided to those students who do not know how to approach and complete tasks.

Figure 1. continued.

7. Background	The information assumes critical background knowledge. The student does not have the experiences and concepts to make new information meaningful (or does not make the connections to personal background experiences). **Therefore,** students need to have information presented in ways that provide background experiences or that make personal background linkages clear.	Students should be taught how to be a consumer of information from a variety of information sources and to ask questions of these sources to gain knowledge and insights.
8. Complexity	The information or associated tasks have many parts or layers. **Therefore**, students need information or tasks broken down and presented more explicitly and in different ways so that learning and performance can occur.	Students should be taught how to chunk tasks, graphically represent complex information, ask clarifying questions, and to work collaboratively in teams to attack complex tasks.
9. Quantity	There is a lot of difficult or complex information that is critical to remember. **Therefore**, students need to have the information presented in ways that facilitate remembering.	Students should be taught strategies for chunking, organizing, and remembering information.

Figure 1. continued

10. Activities	The instructional activities and sequences provided do not lead to understanding or mastery. **Therefore**, students need to be provided with scaffolded learning experiences that include additional or alternative instructional activities, activity sequences, or practice experiences to ensure mastery at each level of learning before instruction continues.	Students should be taught to independently check and redo work, review information, seek help, ask clarifying questions, and inform others when they need more or different types of instruction before instruction in more content begins.
11. Outcomes	The information does not cue students how to think about or how to study information to meet intended outcomes. **Therefore**, students need to be informed of expectations for learning and performance.	Students need to be taught how to identify expectations and goals embedded in materials or to create and adjust goals based on previous experiences.
12. Responses	The material does not provide options for students to demonstrate competence in different ways. **Therefore,** students need to be give different opportunities to demonstrate what they know in different ways.	Students need to be taught how to demonstrate competence, identify and take advantage of performance options offered, and request appropriate accommodations on evaluations.

Figure 1. continued.

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